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Defining and measuring the habit impulse: Response to commentaries

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Defining and measuring the habit impulse: Response to commentaries

Recent commentaries provide much-needed reflection on the nature and measurement of habit (Hagger, Rebar, Mullan, Lipp & Chatzisarantis, 2015; Labrecque & Wood, 2015; Orbell & Verplanken, 2015). My review proposed that habit, as it applies to behaviour, should be defined as ‘a process by which a stimulus automatically generates an impulse towards action, based on learned stimulus-response associations’ (Gardner, 2015). This diverges from previous definitions by proposing that ‘habit’ be used to describe a process, and that the ‘response’ generated by this process be seen as an impulse to act, not a behaviour itself. This article responds to recent commentaries by arguing for the importance of recognizing inhibited habit-generated impulses as meaningful instances of ‘habit’, and suggesting how and in what circumstances frustrated habit impulses might be measured.

Orbell and Verplanken (2015) argue that incorporating impulse in a definition of habit risks confusing a habitual response with trait impulsivity. To be clear, impulsivity refers to a generalised tendency to act rapidly, without thinking, and with insufficient consideration of future contingencies (e.g. Patton, Stanford & Barratt, 1995). The impulse generated by habit, however, is defined as a schematic representation of behaviour which, if insufficiently opposed by competing impulses, triggers the behaviour (Gardner, 2015; West & Brown, 2013). The notion that the habit process generates behaviour via impulses is central to Strack and Deutsch’s (2004) Reflective-Impulsive Model (RIM), which describes “the impulsive system activat[ing] behavioral schemata” (p. 222), and West’s PRIME Theory (Michie & West, 2013; West & Brown, 2013). Indeed, the RIM and PRIME Theory propose that *all* behaviour is impulse-driven; both reflective and automatic processing systems

generate impulses to act or to inhibit action (counter-impulses), which determine action. Multiple impulses compete to control action, and behaviour at any given moment is determined by the impulse that is strongest, or least strongly opposed, in that moment (Michie & West, 2013). Thus, even reasoned action is impulse-driven: intentions direct behaviour where they generate momentary impulses of greater strength than competing impulses.

TABLE 1 HERE

Defining the habitual response as an impulse allows for the possibility that a habit impulse may not translate into action. Dichotomizing impulse strength (strong vs. weak/no impulse) and the subsequent occurrence of behaviour (behaviour vs no behaviour) allows for four possible impulse-behaviour combinations (see Table 1). In contexts in which behaviour has previously been repeatedly performed (and so may be habitual), this analysis distinguishes between behaviours that are not enacted because there is a weak or no such impulse to act (cell D in Table 1), and those not enacted *despite* a strong habit impulse (cell C). Orbell and Verplanken (2015) suggest habit-generated impulses that are blocked (cell C) should not be thought of as ‘habit’, because the behaviour was not enacted. Yet, such ‘hidden’ habits can have important implications for behaviour and health. For example, an actor with sufficient willpower to inhibit a habitual behaviour in most circumstances (cell C) may fail to do so when ego-depleted (e.g. when stressed), or when devoting resources to cognitively effortful tasks, and so the unwanted habitual behaviour will re-emerge (cell A) (Hagger, Wood, Stiff & Chatzisarantis, 2009; Neal, Wood & Drolet, 2013). Measuring the habit impulse that does not manifest in behaviour would create new opportunities for predicting, understanding and influencing health behaviour. For example, detecting latent habit impulses may identify people at risk of recovering old, unwanted habits in

settings where self-regulatory capacity is diminished (e.g. Neal et al, 2013). An impulse measure would also permit truer tests of the effectiveness of intervention techniques for inhibiting habit impulses (cell C), rather than disrupting frequent behaviours that may or may not be habitual (i.e., some unknown combination of cells C and D; Quinn, Pascoe, Wood, & Neal, 2010).

PRIME Theory suggests that impulse generation occurs outside of conscious awareness, such that actors seldom perceive impulses prior to their translation into action. However, impulses rise into awareness where their enactment is blocked, at which point they become experienced as urges to perform the action (West & Brown, 2013). This is illustrated through a simple experiment: place your mobile (cell) phone, with the volume turned up, on a table in front of you, and next time it rings, do not look at it or answer it. You will likely experience a strong urge to attend to the phone, due to learned associations between the cue (phone ringing) and response (looking at or answering it); that is, a habit of looking at or answering the phone when it rings (Bayer & Campbell, 2012)¹. Those with strong habits may feel themselves growing uneasy, tense and restless as the phone continues to ring. The feeling of wanting to attend to the phone is not usually consciously experienced, because the impulse to do

¹ This may, of course, not be habitual for all readers. Additionally, it might be argued that, even among those who automatically look at or answer the phone when it rings, the response is directed towards the goal of wanting to know or talk to whoever is calling; i.e., a goal-dependent, and so non-habitual, response (e.g. Wood & Neal, 2007). However, the impulse to reach for the phone can be activated even where the consequences of doing so are devalued (Smith & Graybiel, 2014). For example, the phone that rings while one is driving may automatically generate the habit impulse (Bayer & Campbell, 2012), despite the goal of answering it being devalued by the safety risks posed by answering while driving. Such goal-independent impulse activation is a hallmark of the habit process (Labrecque & Wood, 2015).

so is usually translated directly and immediately into action. It is only when this impulse is frustrated that it enters consciousness. We become aware of habit-generated impulses when we cannot act on them.

Existing habit measures are largely insensitive to frustrated impulses (cell C, Table 1). Association tests offer ideal measures of the cue-behaviour link that generates the habit impulse (Labrecque & Wood, 2015), but cannot detect whether the impulse translates into action. The dominant self-report measures - Behaviour Frequency x Context Stability (BFCS; ‘frequency-in-context’) measures (Ouellette & Wood, 1998), the Self-Report Habit Index (SRHI; Verplanken & Orbell, 2003), and its derivative Self-Report Behavioural Automaticity Index (SRBAI; Gardner, Abraham, Lally & de Bruijn, 2012) - were developed to distinguish between behaviours directed by habit (cell A) or by non-habit processes (cell B). Consequently, both assume action, and infer habit from either the stability of the performance setting (BFCS), or experiences of the automaticity with which the action occurred (SRHI; Orbell & Verplanken, 2015)². No measures are available to discriminate between strong and weak habit impulses in the absence of action (cells C and D).

A measure of habit impulse that is independent of action would be useful in settings in which people are trying to stop engaging in a behaviour previously repeated in that setting. It would permit detection of habit traces that may pose a risk of recovering old, unhealthy actions. The ringing-phone example above suggests it is

² One SRHI item, which is excluded from the SRBAI, appears to relate to the experience of blocking the habit impulse (‘Behaviour X is something that makes me feel weird if I do not do it’), though validation work has shown that participants struggle to comprehend the meaning of ‘feeling weird’ (Gardner et al., 2012; Gardner & Tang, 2014).

possible to reflect on, and so self-report, the experience of a frustrated impulse, in the same way that the SRHI assesses the experience of acting on the impulse (Orbell & Verplanken, 2015). Indeed, a two-item measure of occurrence and strength of impulses to smoke when abstinent (“How much of the time have you felt the urge to smoke in the past 24 hours?”; “How strong have the urges to smoke been?”) has shown reliability, and predictive validity as a determinant of relapse (Fidler, Shahab, & West, 2011; West & Hayek, 2004). A self-report habit impulse measure must capture the (automatically-cued) desire to act, independently of actual performance. Using the format of the SRHI, which offers statements with which participants rate their (dis)agreement, a habit impulse item might take the form: ‘When in Context Y, I automatically find myself wanting to do Behaviour X’.

The utility of a habit impulse measure will depend on the research setting. Measuring impulses may not be necessary when the focal action is known to have occurred, in which circumstances the impulse may not have been consciously experienced. Where it is reasonable to expect that a habit impulse may have been activated but inhibited, however, an impulse measure may be useful for detecting residual habit. Whether impulses can be adequately self-reported is an empirical question. Self-report will provide at best a proxy measure, because subjective experiences may not reliably distinguish habitual from non-habitual responses (Hagger et al, 2014). Any proposed measure should ideally be validated against objective cue-response association measures. Theoretical predictions that habit should predict performance frequency, and override conflicting intentions in determining behaviour (Triandis, 1977), are inherently problematic as criteria for measuring an impulse that does not elicit behaviour. Testing for these effects under cognitive load, in which conditions habit impulses are less easily self-regulated (Neal et al, 2013),

may provide a more rigorous predictive validity assessment.

My review proposed that habit is most coherently defined as a process whereby the activation of learned cue-action associations automatically generates impulses to act (Gardner, 2015). This raises the possibility that activated habit impulses can be inhibited prior to action. Orbell and Verplanken (2015) argue that inhibited impulses should not be seen as habitual responses. Yet, latent habit impulses have the potential to recover unwanted habitual actions, so require detection in settings in which people have stopped performing a previously repeated behaviour. Existing habit measures, such as cognitive association tests and frequency-in-context measures (Labrecque & Wood, 2015), are insensitive to blocked impulses. Notwithstanding the inherent limitations of reflections on non-reflective processes (Hagger et al, 2015), habit impulses may be open to self-report. Considerable work is required to develop a reliable measure of the habit impulse – and by so doing, to acknowledge that habit-generated impulses are worthy of study, and can help us to understand, predict and influence health-related behaviour.

References

- Bayer, J.B., & Campbell, S.W. (2012) Texting while driving on automatic: Considering the frequency-independent side of habit. *Computers in Human Behavior*, 28, 2083-2090. doi: 10.1016/j.chb.2012.06.012.
- Fidler, J. A., Shahab, L., & West, R. (2011). Strength of urges to smoke as a measure of severity of cigarette dependence: Comparison with the Fagerstrom Test for Nicotine Dependence and its components. *Addiction*, 106, 631-638. doi: 10.1111/j.1360-0443.2010.03226.x.
- Gardner, B. (2015). A review and analysis of the use of 'habit' in understanding, predicting and influencing health-related behaviour. *Health Psychology Review*, Advance online publication. doi: 10.1080/17437199.2013.876238.
- Gardner, B., Abraham, C., Lally, P., & de Bruijn, G. J. (2012). Towards parsimony in habit measurement: Testing the convergent and predictive validity of an automaticity subscale of the Self-Report Habit Index. *International Journal of Behavioral Nutrition and Physical Activity*, 9, 102. doi:10.1186/1479-5868-9-102.
- Gardner, B., & Tang, V. (2014). Reflecting on non-reflective action: An exploratory think-aloud study of self-report habit measures. *British Journal of Health Psychology*, 19, 258-273. doi: 10.1111/bjhp.12060.
- Hagger, M.S., Rebar, A.L., Mullan, B., Lipp, O.V., & Chatzisarantis, N.L.D. (2015) The subjective experience of habit captured by self-report indexes may lead to inaccuracies in the measurement of habitual action. *Health Psychology Review*, Advance online publication. doi: 10.1080/17437199.2014.959728.
- Hagger, M. S., Wood, C., Stiff, C., & Chatzisarantis, N. L. D. (2009). The strength model of self-regulation failure and health-related behaviour. *Health Psychology Review*, 3, 208-238. doi: 10.1080/17437190903414387.
- Labrecque, J.S., & Wood, W. (2015) What measures of habit strength to use? Comment on Gardner (2014). *Health Psychology Review*, Advance online publication. doi: 10.1080/17437199.2014.992030.
- Michie, S., & West, R. (2013) Behaviour change theory and evidence: a presentation to Government. *Health Psychology Review*, 7, 1-22. doi: 10.1080/17437199.2011.649445.
- Moors, A. and de Houwer, J. 2006. Automaticity: A theoretical and conceptual analysis. *Psychological Bulletin*, 132: 297–326.

- Neal, D. T., Wood, W., & Drolet, A. (2013). How do people adhere to goals when willpower is low? The profits (and pitfalls) of strong habits. *Journal of Personality and Social Psychology*, 104, 959-975. doi: 10.1037/a0032626.
- Orbell, S., & Verplanken, B. (2015) The strength of habit. *Health Psychology Review*, Advance online publication. doi: 10.1080/17437199.2014.992031.
- Ouellette, J. A. & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin*, 124, 54-74. doi:10.1037/0033-2909.124.1.54.
- Patton, J.M., Stanford, M.S., & Barratt, E.S. (1995) Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology*. 51, 768–774.
- Quinn, J. M., Pascoe, A., Wood, W., & Neal, D. T. (2010). Can't control yourself? Monitor those bad habits. *Personality and Social Psychology Bulletin*, 36, 499-511. doi: 10.1177/0146167209360665.
- Smith, K. S., & Graybiel, A. M. (2014). Investigating habits: Strategies, technologies and models. *Frontiers in Behavioral Neuroscience*, 8, 39. doi:10.3389/fnbeh.2014.00039.
- Strack, F. & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*, 8, 220-247. doi: 10.1207/s15327957pspr0803_1.
- Triandis, H. (1977). *Interpersonal behavior*. Monterey, CA: Brooks-Cole.
- Verplanken, B. & Orbell, S. (2003). Reflections on past behavior: A self-report index of habit strength. *Journal of Applied Social Psychology*, 33, 1313-1330. doi:10.1111/j.1559-1816.2003.tb01951.x.
- West, R. & Brown, J. (2013). *Theory of addiction*. (2nd ed.) Chichester: Wiley-Blackwell.
- West, R., & Hajek, P. (2004) Evaluation of the mood and physical symptoms scale (MPSS) to assess cigarette withdrawal. *Psychopharmacology*, 177, 195-199. doi: 10.1007/s00213-004-1923-6.
- Wood, W. and Neal, D.T. 2007. A new look at habits and the habit-goal interface. *Psychological Review*, 114: 843–863.

Table 1. Possible impulse-behaviour combinations

		Habit impulse	
		<i>Strong impulse</i>	<i>Weak/no impulse</i>
Behaviour	<i>Behaviour</i>	Habitual behaviour (a)	Non-habitual behaviour (b)
	<i>No behaviour</i>	No behaviour due to impulse inhibition (c)	No behaviour (d)

Note. The distinction between ‘strong’ and ‘weak’ impulses is crude and made for illustrative purposes, as impulse strength is more realistically portrayed on a continuum (Moors & de Houwer, 2006).